

FREQUENCIES VHF, UHF, SHF NEWSLETTER

NZ

This newsletter is compiled by Kevin Murphy ZL1UJG to promote operational and construction activity on the VHF, UHF and SHF Amateur Radio allocations in New Zealand (and overseas).

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MMT1296 Transverter Upgrade

Apologies...It seems I made a Faux Pas in the compression figures of the TX side. I made the compression tests in a temporary lash up at home and the figures appear to be incorrect.

Earlier tests had indicated significant compression on the upconverter PCB (2.5 dB compression @ +24 dBm (250 mW) CW output) Later tests on the complete transverter indicated about 3 dB compression @ +30 dBm (1 watt) CW output. The later tests were done with the modifications in the DC switching and driver biasing.

Two tone IMD testing at the 1 watt level showed significant products, up to very high orders.

Other transverters of similar design and age have an extra amplifier stage in the upconverter. I surmised that it was to reduce the need for excess IF drive levels to the mixer and compression in the early stages in the transverter. The MMT1296 upconverter (transverter), has significant compression in the mixer and early amplifier stages, when driven to its nominal output power, due to insufficient gain/power capability

The decision was made to replace the original 1st TX amp in this unit, which used a BFR34a bipolar transistor. Fortunately more recent devices such as the Minicircuits ERA-5 MMIC, have ~ 18 dB gain and output power of about +18 dBm @ the 1 dB compression point. (A Sirenza NGA586 {now obsolete} instead of a ERA-5 was used in this unit) Unwanted components were removed from the PCB.

After a retune the IMD products were measured and are drastically reduced. In fact the IMD performance is about the same at the +30.6 dBm (1.1 watt) PEP level as it was at the +23 dBm (200 mW) level. I was able to drive the transverter output in excess of +32.2 dBm and the IMD worsened, but was still what I would call usable.

The replacement of the 1st transmit amplifier redistributes the gain/compression so that the dominant IMD products are primarily due to the final TX amplifier.

The TX gain compression is reduced from ~ 3dB at + 30 dBm to ~ 1 dB at + 30.6 dBm.

The data below indicates the improvements made by replacing the BFR34a with a ERA5 MMIC or similar device. Later versions of the MMT1296 transverter replaced the BFR34a with a higher power MRF559. The MRF559 and accompanying changes of using a relay to switch the TX DC increased the maximum saturated power to 2 watts. The 2 watts was only achievable when overdriven by about 8 dB. A more typical power would be 1.5 watts (from reviews by G3OSS)

These modifications were not done on a later model MMT1296 transverter as I don't have one. If anyone has done similar 2 tone tests to the later model transverter I would be interested to see the results

Levels of IMD	are wrt the levels	of the individual	tones (dBc)	i.e not PEP
Intermod Order	+23 dBm PEP. PSU & bias mods	+30 dBm PEP. PSU & bias mods	+30.6 dBm PEP. New 1 st TX amp	+32.2 dBm PEP. New 1 st TX amp
3rd	-33	-16	-30	-26
5th	-47	-30	-44	-40
7th	-56	-44	-55	-52
9th	-65	-43	-60	-58
11th		-50		-66
13th		-55		

Microwave

A well deserved addition to the short list of ZL stations who have worked VK on 1296 MHz is Ray ZL2TAL, from New Plymouth. Ray operates from home, using an Icom IC1271 23cm transceiver, which feeds 10 watts to a 23 element Loop Yagi at 6.5m (via Belden 9913 coax). Despite local obstructions, he succeeded in having a QSO at 55 with Ross VK2DVZ at 6.50pm on the 13th October. He also had 144 and 432 contacts with Ross at S9++ levels leading up to this contact. Ray had been trying to contact VK on 1296 MHz for many years. Excellent news Ray!!

On the 12th October 2004, Nick ZL1IU succeeded in having a 23 cm QSO with Ross, VK2DVZ. (Nick had previously had 23 cm QSO's to VK, last DX season). Nick has a FT221 driving a Microwave Modules MMT 1296 Transverter (no longer produced) and 14 watt amplifier. The antenna is a 23 element Loop Yagi at 8.5m agl. Coax is currently LDF450, however this will be replaced soon.

When ZL stations work VK on 1296 MHz, Ross VK2DVZ is one of the most active stations. His station consists of an Icom 1271 23cm transmitter feeding a 120 watt water-cooled 2C39 PA in the shack, while on RX a masthead PHEMT preamp feeds a RX converter to 144 MHz, then to 28 MHz, which then feeds a Kenwood TS850S, used as a receiver. The antenna (shown below) is a homemade VE4MA scalar horn feed, feeding a 2.5m solid dish at 6.5m. (Gain ~ 27 dB). Coax used is Andrews LDF550 and LDF450. With an increasing number of stations appearing on 1296 MHz in ZL, I am sure Ross VK2DVZ will work more ZL stations.



Simon ZL1SWW is now using a Minikits EME72 10 mW transverter for 1296 MHz (www.minikits.com.au) instead of fighting alignment problems (LO rejection) in the old DF8QK TX strip. The EME72 was built easily and tuned up easily with excellent performance. Simon is looking at increasing the TX power up to several watts. Simon ZL1SWW and Harry ZL1BK made 20 element Loop Yagis for their 23cm stations and wonder if others are interested in Loop Yagi kits (excluding boom). Simon may be contacted by email at zl1sww@nzart.org.nz

Kevin ZL1UJG (columnist) has improved the linearity of his MMT1296 transverter by replacing the original 1st TX bipolar amplifier with a MMIC device.

Murray ZL3MH, Christchurch will be doing some tests with his 1296 MHz RX converter/preamp and his bi-quad antenna or '8' antenna. He has heard signals from the West coast on the lower bands and hopes that signals on 23cm will also make the path. In Christchurch Rod ZL3NW has recently acquired a rig with 23cm capability and reports that he had a FM contact with Mark ZL3AIC and also had a contact with Starr ZL3CU. At this stage, Rod is using a discone and will get a loop yagi up on his tower

From the other side of the island, James ZL3FV (ex - ZL3TJZ) in Hokitika will be installing soon a 20 element loop Yagi for 23cm for use with a loaned transverter. Bob ZL3TY also has a loaned 23cm transverter. He uses it with a IC251 fitted with a 6 dB attenuator to set IF drive to about 2 to 3 watts, This is an excellent idea, rather than rely on the power level (or mic level) control in the rig, which may result in ALC overshoot. Bob has constructed a simple dual quad '8' antenna. Bob and James are about 40 km apart so testing between them should begin soon.

A point to note is that many of the ZL Microwave records and some of the 23cm contacts to VK have been done with TX powers of 1 watt or less.

Not neglecting 13cm, Scott ZL1KB has acquired a second hand DEMI 13 cm transverter. He also has 16 turn helical antennas previously used for AO40 reception.

Steve ZL1TPH kindly gifted some faulty Icom IC202 SSB transceivers to the Waikato VHF Group. These have now been repaired and are suitable for transverter IF's for the microwave bands or as a standalone 2m SSB transceiver. If any stations are interested in these units, (especially younger or retired people) let Kevin ZL1UJG know (email at end of column)

DX

At this time of year, remember that most SSB activity between VK and ZL occurs in the region of 144.100, 432.100 and 1296.100 MHz, so monitor those frequencies.

During the 12th, 13th and 14th of October, 2004 Ross VK2DVZ in Cundletown, NSW worked a number of ZL stations. On 2m Ross worked ZL1IU, ZL2TAL, ZL1BT, ZL2TWR, ZL3NE, ZL1AKW and ZL2TE. On 70cm and 23cm, ZL1IU and ZL2TAL were worked.

Nick ZL1IU worked Gordon VK2ZAB on 2m on the 11th October at 0506z, Ch5A and the pagers from central NSW were very loud. 70 cm was also attempted with Gordon but copy was insufficient. On the 12th, VK2ZCV was worked on 2m and then Ross VK2DVZ was worked on 2, 70 at 0736z and also 23cm at 0822z.

On the 13th, Nick worked a few VK2's on 2 and 70 and had another contact with VK2DVZ on 23 at 0638z and then worked a few VK4's around Brisbane on 2 and 70cm. Also worked on 2m, were VK4KK and VK4AJS in the Rockhampton area. Nick ZL1IU and John VK4AJS tried 70cm but despite hearing traces of each other did not make contact.

On the 14th, Nick worked VK4AFL on 2m and 70cm. VK4AJS was also worked again on 2m. Signals from VK4AJS on 2m were still present at 1800z, as was the VK4RTT Beacon at 1830z. (Nick ZL1IU)

6m

6m showed some life on 16th October, with Kerry ZL2TPY and Bob ZL4AAA working into Japan. Bob ZL3TY heard the FK8SIX beacon the same day. Bob ZL4AAA had another good opening to Japan on the 17th October.

On November 2nd Kerry ZL2TPY worked into KH6 and on 5th November Kerry reported hearing the XE1KK beacon weakly.

After a couple of big solar flares there were strong auroral signals on the afternoon of Monday 8th November. First signals noted were the VK TV carrier on 46.171 MHz followed shortly after by strong auroral backscatter on ZLTV on 45.25 and 50.75MHz. In the following 5 hours the following stations were worked on 50MHz: VK2BZE, VK3DUT, ZL3MF, ZL4LV, VK3EK, ZL3NW, ZL3NE/1, VK3DOU, VK3SIX, VK7ZOO. Channel 5A carriers on 138.775 and 143.775MHz were audible but no 2m signals were heard. (Bob ZL3TY)

Rod ZL3NW completed a 6m EME QSO with IW5DHN on October 22 which extends the digimodes EME world record, which Bob ZL3TY previously held with IW5DHN. Rod has also completed with JM1SZY on 22 Oct and has had unsuccessful skeds with JH2COZ. (Bob ZL3TY)

Conferences

Microwave Update (MUD 2004) was held mid October in Dallas, Texas. The talks are available at the North Texas Microwave Society website www.ntms.org.

Steve, ZL1TPH sent one of his 1296 MHz GaAsfet preamps along for Noise Figure and Gain testing in the RF facilities they have during the conference. It came 2nd behind their reference preamp. (Noise Figure was ~ 0.38 dB and gain 16 dB)

Next years Microwave Update 2005, is to be held in 27-30 October in Cerritos, California. It is organised by the San Bernadino Microwave Society & Western State

Weak Signal Society. Contact: Patrick Coker, N6RMJ for more information by email: n6rmj@sbcglobal.net

Murray, ZL3MH highly recommends the Wyong Field Day/ Hamfest in New South Wales, Australia. The 2005 Hamfest will be held on 20th February, 2005. If you intend to go, then book flights and accomodation early. For more information see <http://mail.panaseer.net.au/~dhardy/ccarc/fieldday/index.html>

General

A small but dedicated group of SSTV'ers has been meeting for discussion and exchange of pictures, on Thursday nights at 8 p.m. on the 146.900 MHz Auckland repeater.

Specifications on equipment shouldn't be taken as published. Commonly available 30 watt VHF boosters (example THP HL37V) are driven nicely with handhelds. But care should be taken when using similar amps on SSB, as only 500 to 750 mW may be required to drive them linearly (NOT 3 watts!!). If available, use the high/low power switch on the radio. If it doesn't have this facility then an external attenuator of ~ 7 dB may be constructed. The boosters normally have internal preamps so they can be used to offset the attenuation on receive.

On September 19th, a new world record was set on the 47 GHz band. W6QI and AD6FP completed a 47 GHz contact over a 290 Km distance to set a new world record. W6QI operated from Shuteye Peak DM07GI, just south of Yosemite and AD6FP operated from Frazier Mountain, DM04MS north of Los Angeles. W6QI had to brave 30 degree (F) temperatures and snow while modifying the radio in order to complete the contact. (This

was summer weather!) Signal margins were >40 dB on the W6QI end and about 8 dB on the AD6FP end. The contact was completed using a combination of narrow band FM and CW. W6QI used a 36" cassegrain dish, +10dBm TX, 8 dB NF RX, with a OCXO locked oscillator, while AD6FP used a 12" splash plate dish, +45 dBm (30 watt) TX, 4 dB NF RX, with a Rubidium locked oscillator.

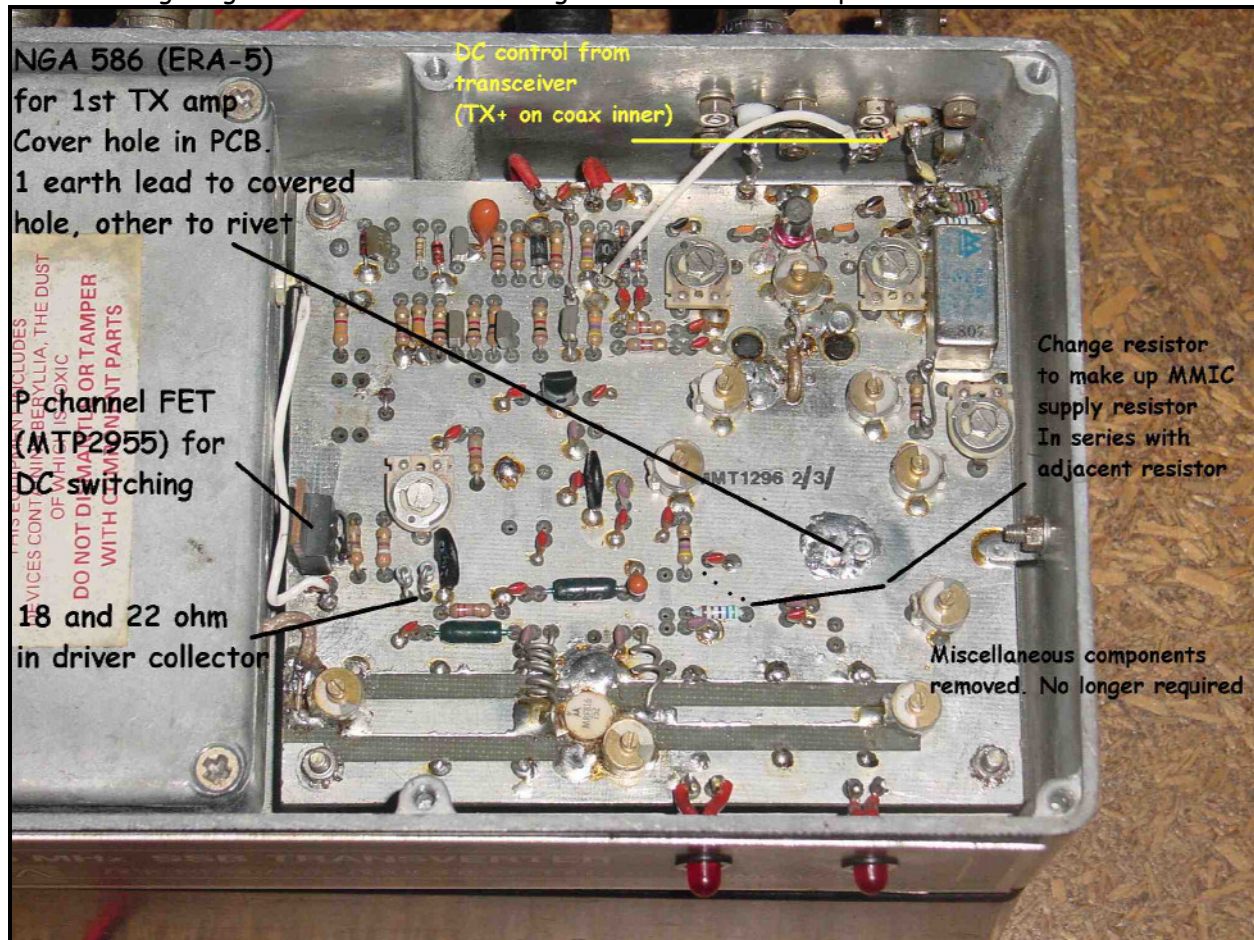
Cliff Betson Contest - 50 MHz and up. Saturday 15th and Sunday 16th of January 2005. Times 1600-2200 NZT Saturday, 0800-1400 NZT Sunday.

The Contest Rules were published in September/October 2000 Break-In. The rules are also available at: www.nzart.org.nz/nzart/update/contests/vhfcontestrules.html

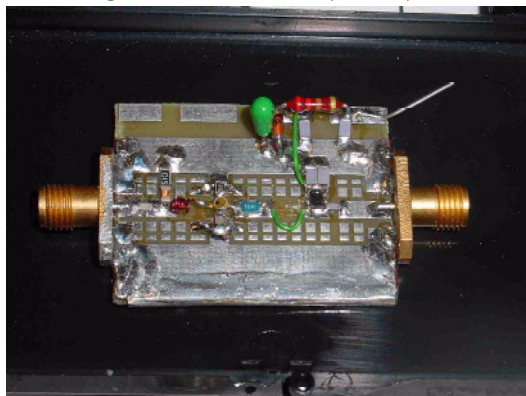
I am always on the lookout for column material. I would welcome any pictures and information from VHF/UHF field days and any other VHF/UHF related activities. Please send to Kevin at rfman@xtra.co.nz

End of VHF Scene column

The following image shows some of the changes to the MMT1296 upconverter PCB



The image below shows a preamp similar to that which gave 0.38 dB Noise Figure at Microwave Update 2004 in Dallas Texas.



An amateur recently becoming active at the weaksignal end of the VHF/UHF bands commented that some participants in recent contest activity were not giving their callsigns or locations (very often, if at all). There are usually stations listening to your (weak) signals not only at contest time but during normal activity (Yes even in NZ !). Help new participants in contesting or becoming active at the SSB/CW end of the VHF/UHF bands by identifying your station and location **It is a license requirement to identify your station by your callsign**